

April – June 2022

Fires on mobile plant



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Overview

In FY 2022 Q4, there were:



NOTIFIED INCIDENTS

47

An increase of 5 from 42 in FY2022 Q3

35 Surface coal (74%)


6 Underground metals (13%)

3 Construction metals (6%)

1 Underground coal (2%)


1 Surface metals (2%)

1 Mineral sands (2%)



NOTICES ISSUED

1




ANCILLARY REPORTS COMPLETED

47 (Average completion was 94%)

Incident notifications classified against material unwanted events (MUE)

MUE		Most common threat with failed critical control	Most common failed critical control
Fire or explosion surface 41	23 of 41	Accumulated flammable leaks and spills	23 of 41 Flammable fluid containment
Fire or explosion underground 6	4 of 6	Mechanical energy in the presence of fuel	3 of 6 Flammable fluid containment


Ancillary reports summary



Heat source

30%


EXHAUST SYSTEM



Fuel source

30%


ENGINE OIL



Failed component

21%

HOSE



Extinguished by

40%

HANDHELD FIRE EXTINGUISHER

Executive Summary

This report has been prepared by the NSW Resources Regulator for the NSW mining industry, original equipment manufacturers and suppliers. It contains quarterly data of notified incidents involving fires on mobile plant (FOMP) for the period 1 April 2022 to 30 June 2022.

The Regulator's position is that all fires on mobile plant are avoidable and preventable and we have adopted a zero-tolerance approach where mine operators have not taken appropriate steps to manage this risk.

Fires on mobile plant are inherently dangerous. They affect the safety of workers and have potentially catastrophic consequences. Despite a focus on the issues in recent years, the number of incidents remains high. The Regulator is committed to working with industry to ensure health and safety obligations are being met to reduce the number of fires on mobile plant and to prevent potentially catastrophic events.

The Regulator has published quarterly reports on fire on mobile plant incidents since 2018. From FY2023, this information will be provided in an annual report. Information on fires will continue to be provided at industry engagement forums such as scheduled quarterly engineers and managers forums, and published in the weekly incident summary.

Quarterly data for 1 April 2022 to 30 June 2022 identified the following:

- There has been a slight decrease in fire on mobile plant incidents for the period since amendments occurred to the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014 in February 2020.
- There has been an increase in fire on mobile plant incidents that involve the combination of friction (being the heat source) and grease (being the fuel source), increasing from one incident last quarter to four incidents this quarter.
- Although hose remains the most common failed component in FOMP incidents, there was a 33% decrease this quarter. There was an increase this quarter in 'any part of the turbo' being listed as a failed component, with seven incidents this quarter compared to two in Q3.

Significant incidents

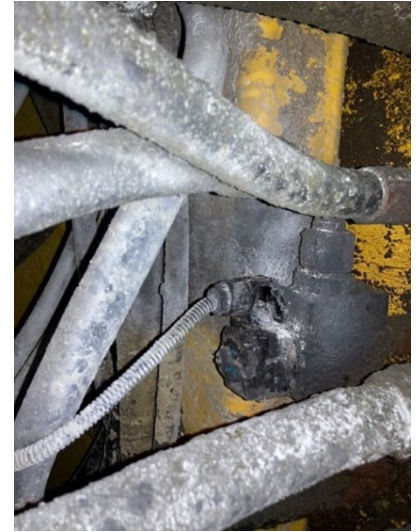
June 2022 – IncNot0042420

At an underground Metalliferous mine a shotcrete crew were setting up a Jaco Maxijet shotcreter underground when a glow was noticed under the unit.

Upon inspection small flames were observed.

The flames were extinguished with a handheld extinguisher. The source of the fire was a failed solenoid coil. Possible causes of failure were loose and corroded terminals or mechanical failure of the internal components.

Figure 1: Burnt coil on shotcreter unit

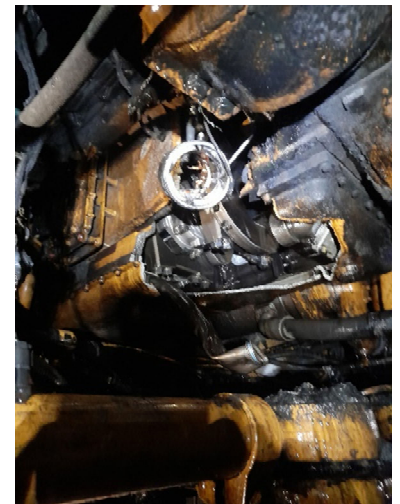


May 2022 – IncNot0042256

At an open cut coal mine an operator of a Caterpillar 793D dump truck was driving up a ramp when the truck started feeling sluggish and smelt a burning smell. The operator noticed flames coming from back of cab. The operator tried to pull suppression pin but missed and escaped down the emergency ladder because the flames were up behind the cab. The worker ran behind a bund and waited to be picked up by the emergency response. A water cart was following which doused the fire. Fire suppression activated and water carts finished off the fire.

The cause of the fire was a catastrophic engine failure.

Figure 2: Engine failure location



May 2022 – IncNot0042206

At an underground Metalliferous mine an operator of a Caterpillar AD60B underground haul truck was just below the portal stockpile when they noticed flames from engine compartment around the turbo area. The operator has pulled into stockpile and manually operated the AFFF. They alighted the truck and grabbed a handheld fire extinguisher from the truck. By that time there was still a small amount of flame visible, which the operator extinguished with the handheld extinguisher.

The cause of the fire was the premature fuel hose failure due to excessive twist in the hose weakening the steel braid caused by over tensioning of union nut on hose end by not following correct fuel line installation procedure.

May 2022 – IncNot0042146

At an underground Metalliferous mine an operator of a Sandvik TH663 Haul truck was on the decline when they noticed a cloud of gas come out of the front and sides of the truck. They operator pulled up and then noticed a small flame in the engine bay on the right-hand side. The operator then activated the fire suppression system which extinguished the fire.

The cause of the fire was a seized engine idler pulley

Figure 3: Seized engine idler pulley



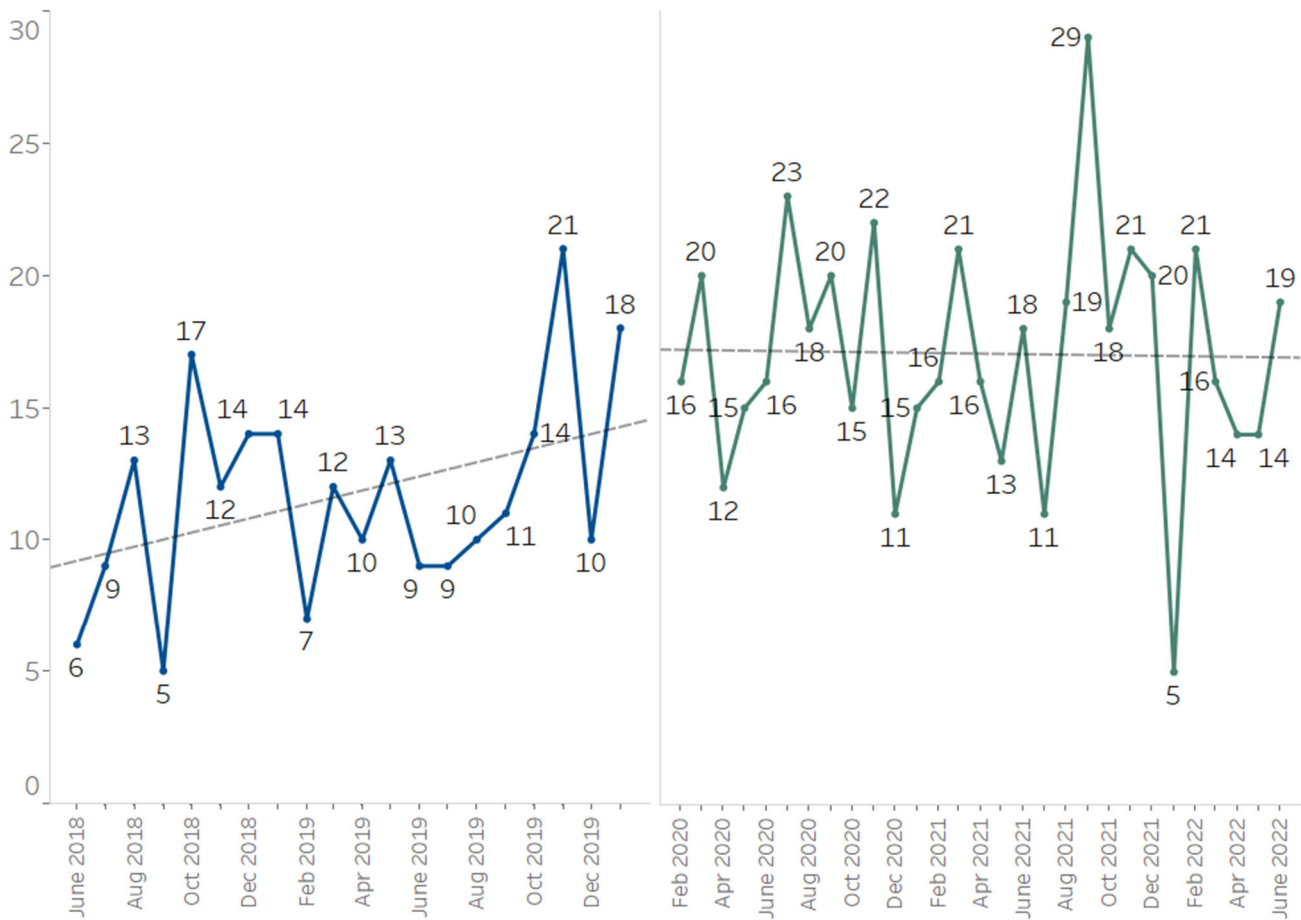
Notified incidents

Notified incidents between June 2018 and June 2022

Figure 3 relates to incidents involving fires on mobile plant notified to the Regulator each month since June 2018, based on the date the incident occurred.

In February 2020, amendments to the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014 saw a change to the duty to notify all incidents involving fires on mobile plant. The two trend graphs below represent the periods before and after this amendment took place, revealing a slight decrease in FOMP notified incidents since this time.

Figure 3: Notified incidents between 1 June 2018 and 30 June 2022



Notified incidents by legislative requirement to report

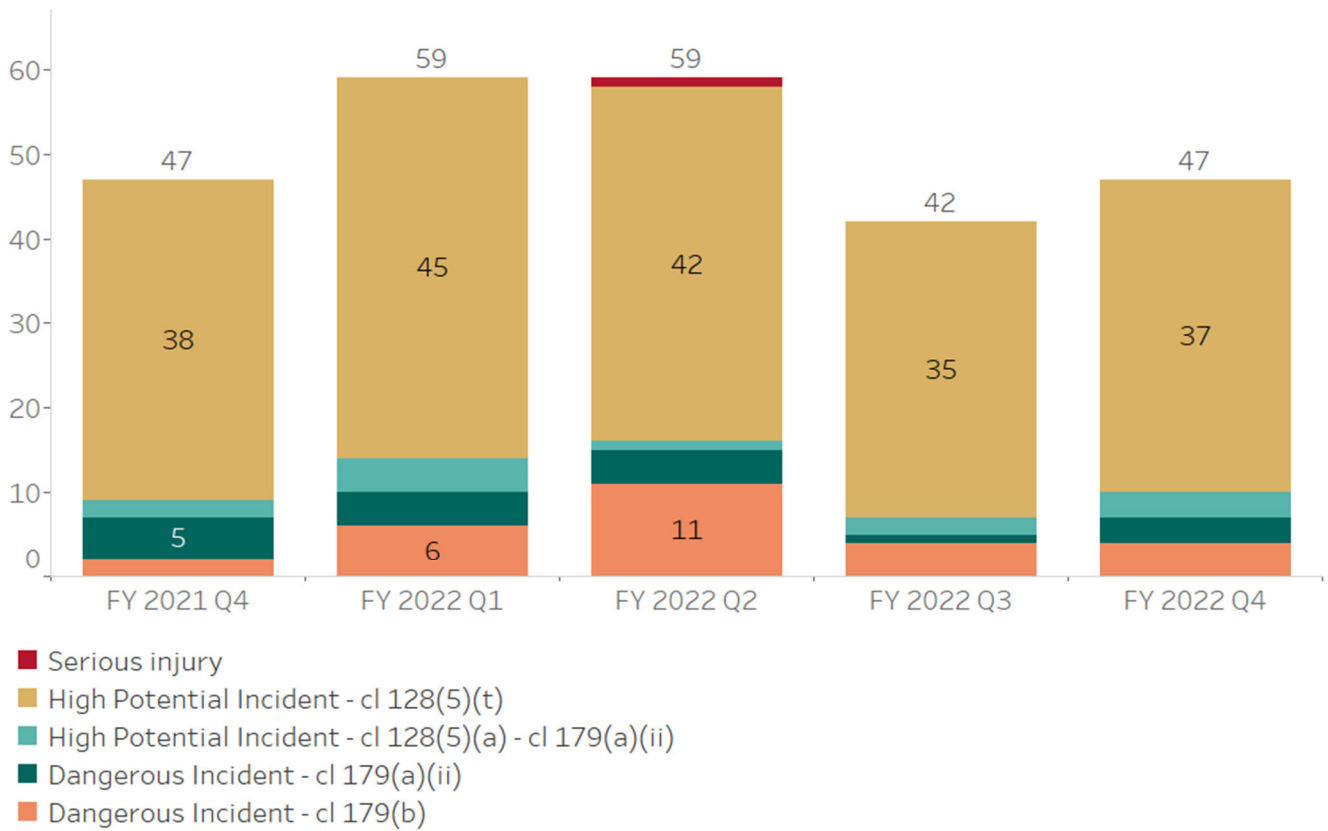
Figure 4 highlights the number of notified incidents recorded by the legislative requirement to report.

The majority of fires on mobile plant notified to the Regulator since 1 April 2021 were recorded as a high potential incident under cl 128(5)(t), where there was ‘an uncontrolled fire on mobile plant that is in operations (whether operated directly, remotely or autonomously)’.

Four incidents were recorded this quarter as a dangerous incident under cl 179(b) where there was ‘a fire in the underground parts of a mine, including where fire is in the form of an oxidation that releases heat and light’.

There have been no serious injuries recorded for FOMP incidents in the last two quarters.

Figure 4: Notified incidents by legislative requirement to report between 1 April 2021 and 30 June 2022



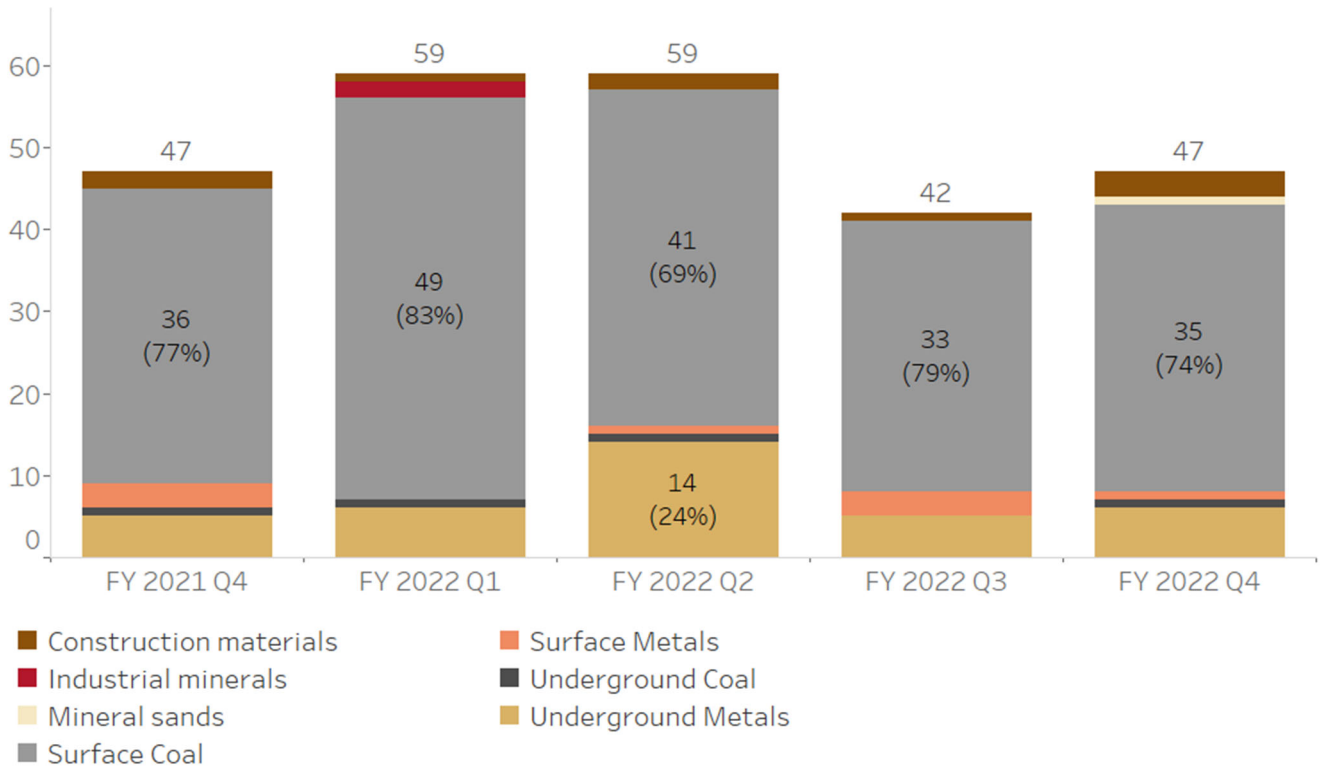
Notified incidents by mine and operation type

Figure 5 shows the number of notified incidents by mine type and operation type.

Incidents occurring at mines categorised as surface coal remain the highest category, accounting for 74% of FOMP incidents since April 2022.

This quarter saw the first notified incident at a mine categorised as mineral sands since FY2021 Q3.

Figure 5: Notified incidents by mine and operation type between 1 April 2021 and 30 June 2022

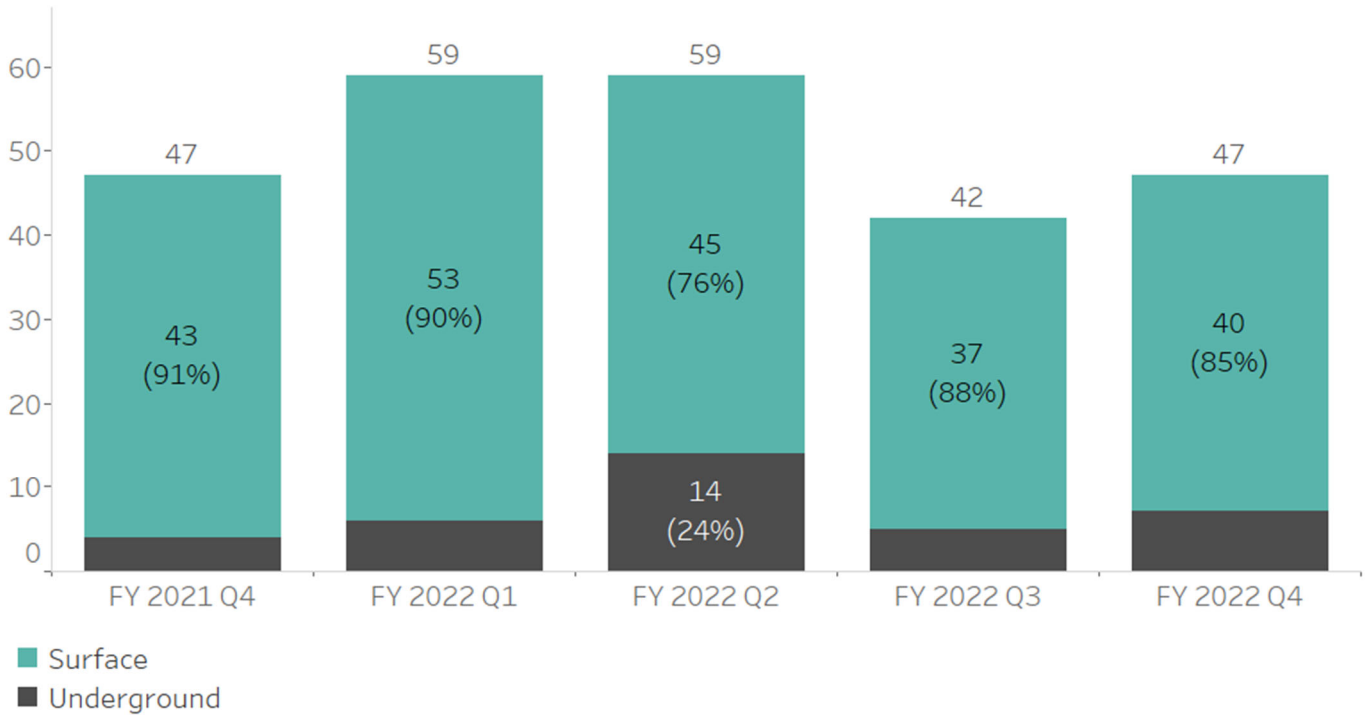


Notified incidents by primary location

Figure 6 shows that the actual location of FOMP incidents, irrespective of the mine operation type, typically occurs on the surface rather than underground.

There have been 7 fire on mobile plant incidents reported as occurring underground for this quarter, an increase from 5 underground incidents last quarter.

Figure 6: Notified incidents by primary location between 1 April 2021 and 30 June 2022



Notified incidents by mine type, operation type and incident location

Notified incidents occurring on the surface at a surface coal mine account for 74% of all fires on mobile plant this quarter, which is a lower percentage of total incidents than the last quarter (79%).

Of the 254 notified incidents in the last five quarters, only 0.8% occurred underground at an underground coal mine.

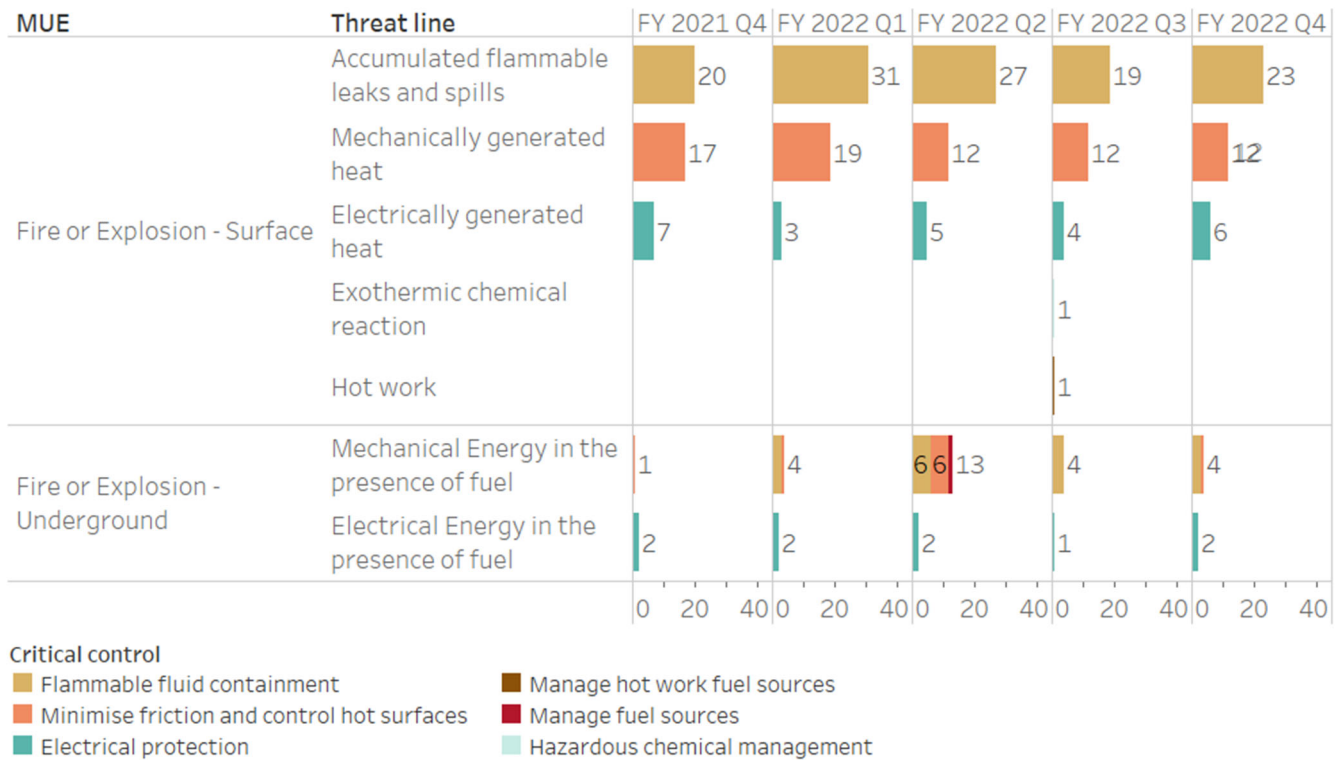
Table 1: Notified incidents by mine type, operation type and incident location between 1 April 2021 and 30 June 2022

MINE TYPE/OPERATION TYPE/ INCIDENT LOCATION	FY2021 Q4	FY2022 Q1	FY2022 Q2	FY2022 Q3	FY2022 Q4	GRAND TOTAL
Coal/surface/surface	36	49	41	33	35	194
Coal/underground/surface	1	1	-	-	-	2
Coal/underground/underground	-	-	1	-	1	2
Metals/surface/surface	3	-	1	3	1	8
Metals/underground/surface	1	-	1	-	-	2
Metals/underground/underground	4	6	13	5	6	34
Mineral sand /surface/surface	-	-	-	-	1	1
Construction materials/surface/surface	2	1	2	1	3	9
Industrial minerals/surface/surface	-	2	-	-	-	2
Grand total	47	59	59	42	47	254

Classified notified incidents by hazard, threat and critical control

Hazard management bowties are a widely used risk management tool that incorporate preventative and mitigating controls onto threat lines that relate to a material unwanted event (MUE). The Regulator uses MUE bowtie frameworks when proactively assessing how mine sites manage their principal hazards. Since October 2019, these MUE bowtie frameworks have also been used to classify notified incidents. Classifications highlight increased areas of risk at the hazard, MUE, threat and critical control level.

Figure 7: Notified incidents classified by MUE, threat and critical control between 1 April 2021 and 30 June 2022

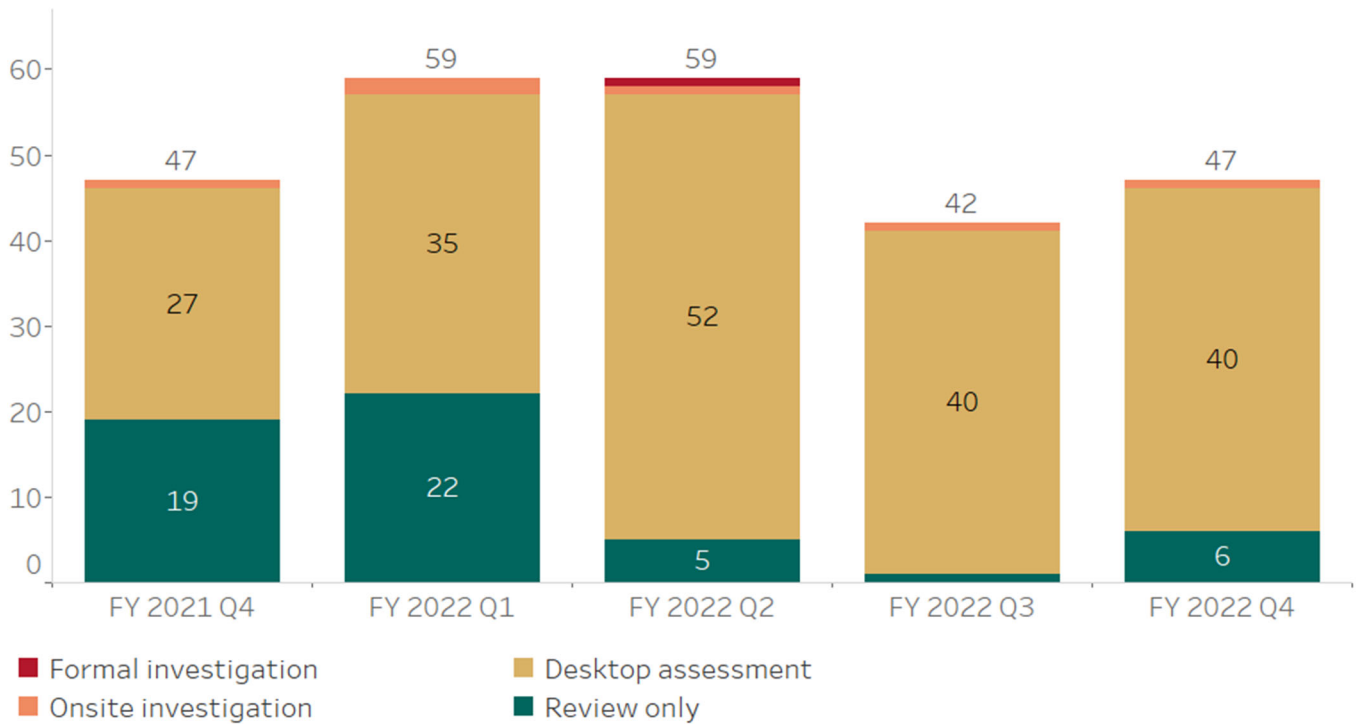


Our response to notified incidents involving FOMP

As part of the Regulator’s position paper on preventing fires on mobile plant, all fires that occur on mobile plant are preventable. For each incident reported, it is assessed with the outcomes reviewed. This involved an inspector attending the mine (onsite investigation) or a review of the investigation findings and actions (desktop assessment).

Figure 8 shows that for this quarter, a desktop investigation was our response to 85% of fires on mobile plant incidents, with one onsite investigation being conducted.

Figure 8: Notified incidents by response level between 1 April 2021 and 30 June 2022

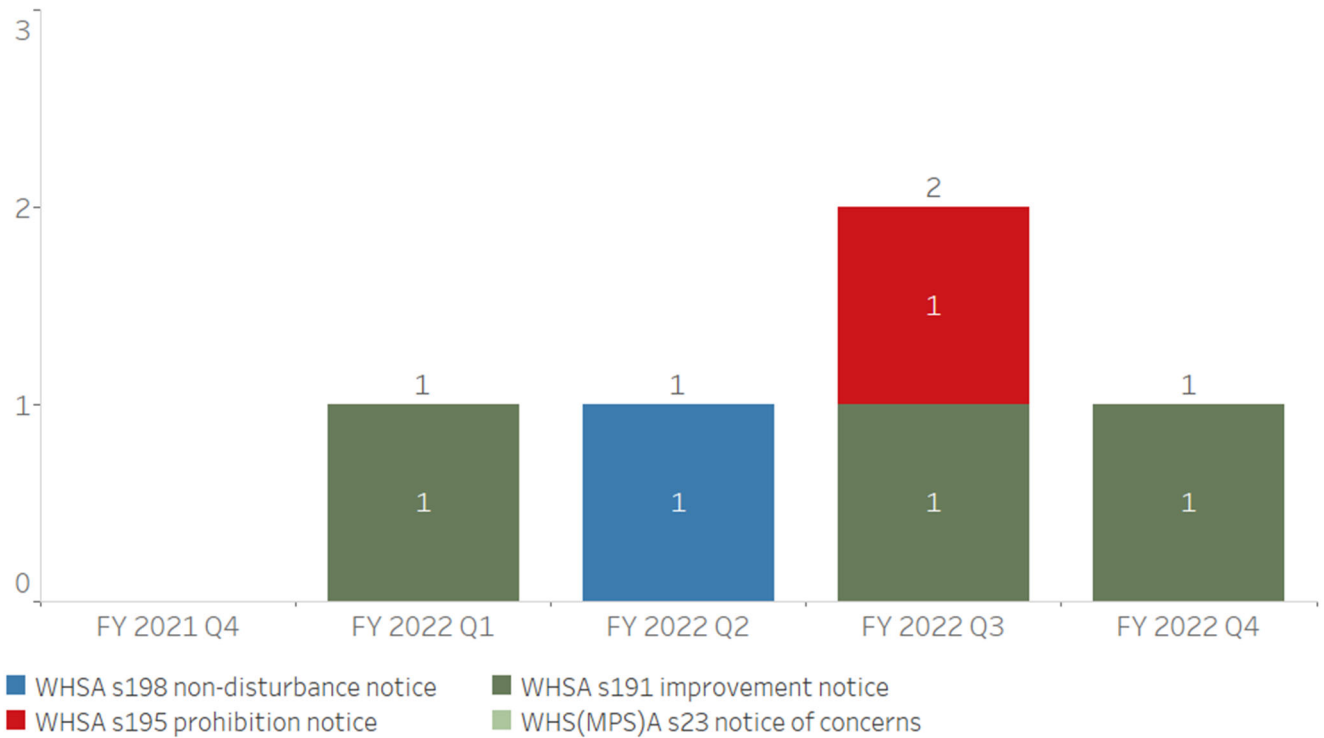


Notices issued

As part of the Regulator’s position paper on preventing fires on mobile plant where a mine operator has not taken appropriate steps to manage the risk of fires on mobile plant, escalated enforcement action will be taken.

Figure 9 shows that one notice was issued in relation to notified incidents involving FOMP this quarter, being one s191 improvement notice issued under the *Work Health and Safety (Mines and Petroleum Sites) Act 2013*.

Figure 9: Notices issued in relation to FOMP incidents between 1 April 2021 and 30 June 2022



Fires on mobile plant ancillary reports

When an incident involving fires on mobile plant is notified to the Regulator, additional information, known as an ancillary report, must be submitted via the Regulator Portal no later than 30 days after the incident was required to be notified. At the time of this report, 47 ancillary reports were completed for FY2022 Q4.

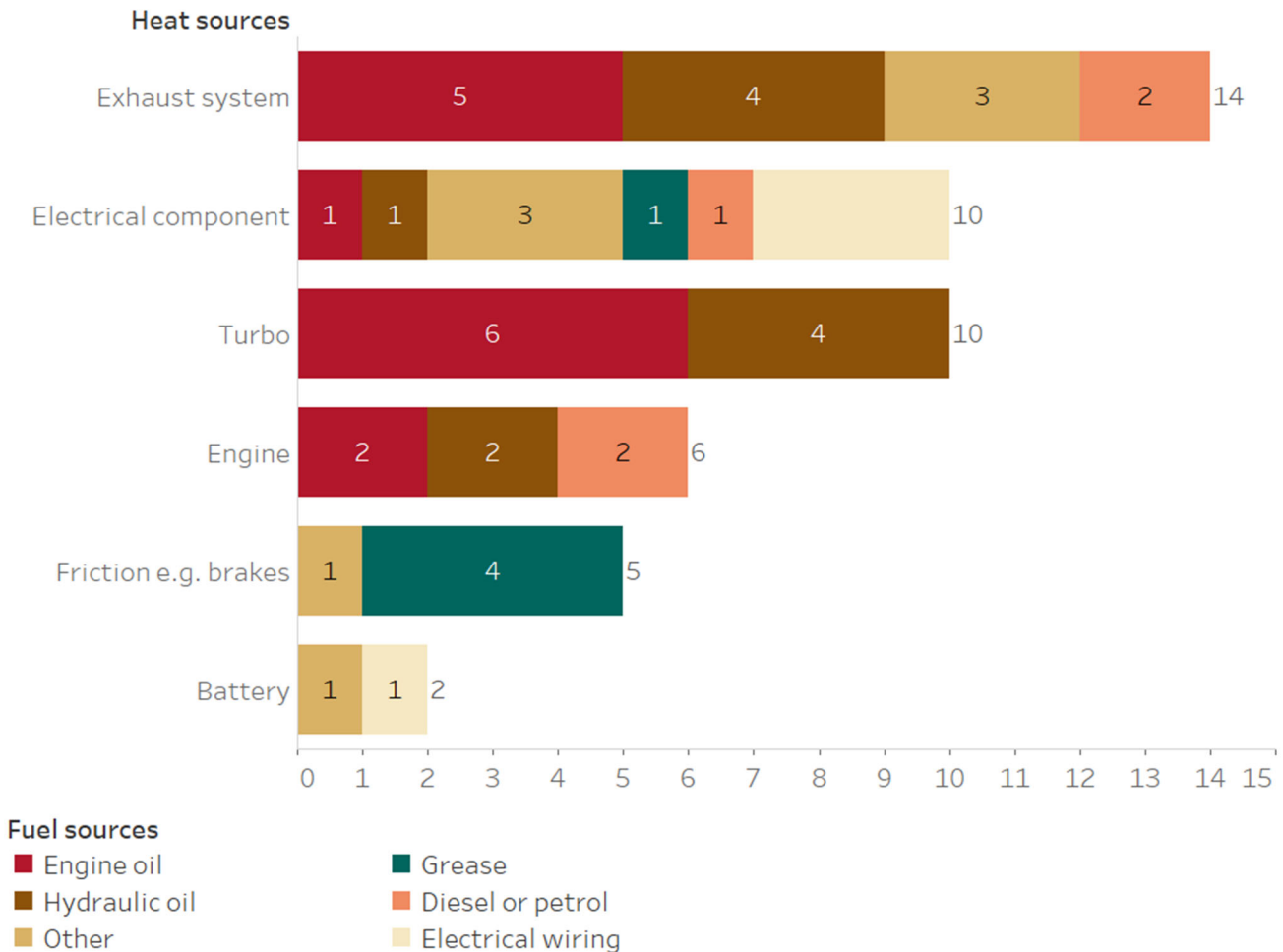
Ancillary reports – combination heat/fuel sources

Data for heat sources and fuel sources for FOMP notifiable incidents this quarter indicate that the ‘turbo’ heat source category and ‘engine oil’ fuel source category combined for six out of 47 incidents (13%) recorded in ancillary reports.

The second most common combination this quarter was ‘exhaust system’ and ‘engine oil’, accounting for five out of the 42 incidents (11%).

Four incidents involved the heat source of ‘friction’ and the fuel source of ‘grease’, making up 9% of incidents this quarter and representing an increase of three incidents from last quarter.

Figure 10: Ancillary reports - fuel sources combined with heat sources, between 1 April 2022 and 30 June 2022



Fires on mobile plant April – June 2022

Table 2: Ancillary reports – fuel sources combined with heat sources, between 1 April 2021 and 30 June 2022¹

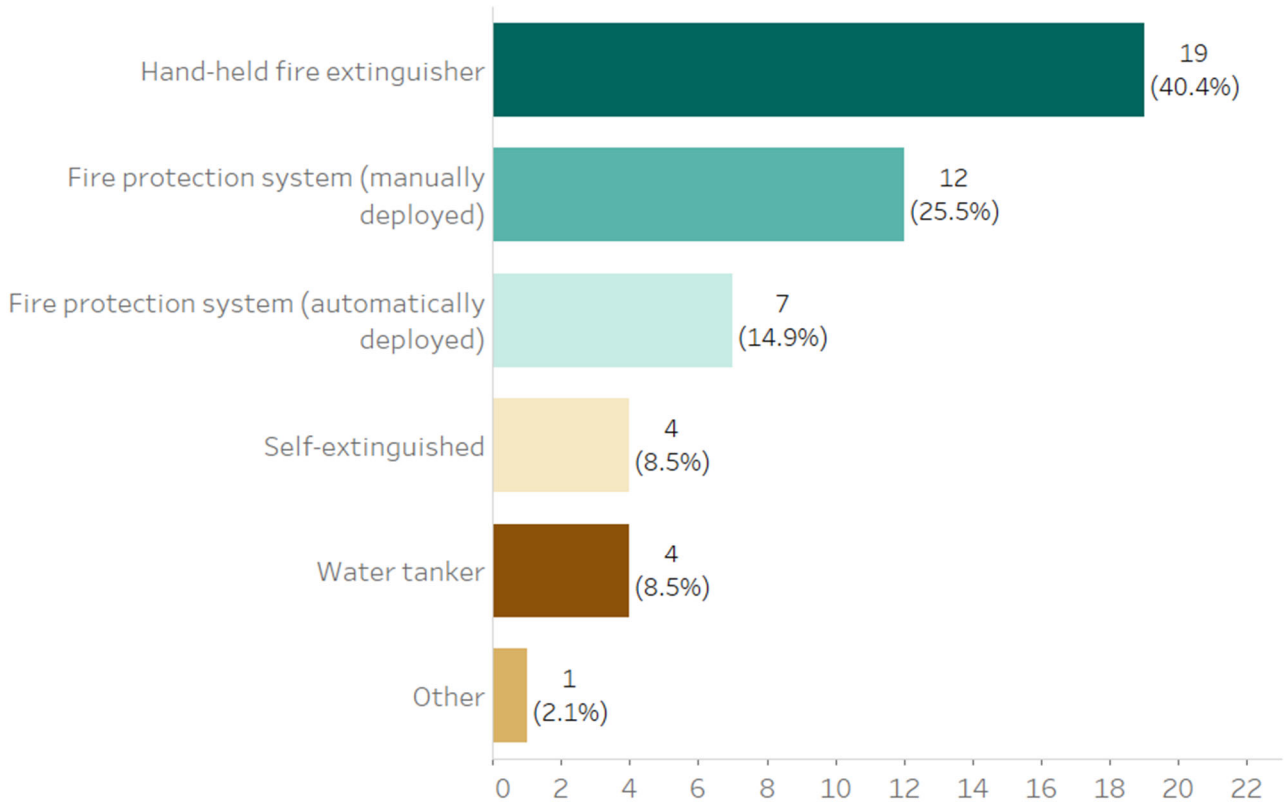
HEAT SOURCE + FUEL SOURCE	FY2021 Q4	FY2022 Q1	FY2022 Q2	FY2022 Q3	FY2022 Q4	GRAND TOTAL
Exhaust system + hydraulic oil	5	7	3	12	4	31
Electrical component + electrical wiring	6	5	9	4	3	27
Turbo + engine oil	4	8	3	4	6	25
Exhaust system + engine oil	7	6	4	1	5	23
Turbo + hydraulic oil	3	6	7	1	4	21
Exhaust system + other	1	4	3	6	3	17
Exhaust system + diesel or petrol	2	3	5	1	2	13

¹ 10 or more incidents since 1 January 2021

Ancillary reports – extinguished by

Figure 11 shows that a handheld fire extinguisher remains one of the highest recorded methods of extinguishment. The second highest method of extinguishment this quarter was recorded as a manually deployed fire protection system, recorded in 12 notified incidents of fire on mobile plant.

Figure 11: Ancillary reports - extinguished by, between 1 April 2022 and 30 June 2022



Fires on mobile plant April – June 2022

Table 3: Ancillary reports – extinguished by, between 1 April 2021 and 30 June 2022

EXTINGUISHED BY	FY 2021 Q4	FY 2022 Q1	FY 2022 Q2	FY 2022 Q3	FY 2022 Q4	GRAND TOTAL
Handheld fire extinguisher	20	21	26	18	19	104
Fire protection system (manually deployed)	11	17	14	13	12	67
Fire protection system (automatically deployed)	6	11	4	4	7	32
Self-extinguished	5	5	6	3	4	23
Water tanker	2	4	5	3	4	18
Other	3	-	3	-	1	7
N/A	-	1	-	1	-	2
Did not extinguish	-	-	1	-	-	1

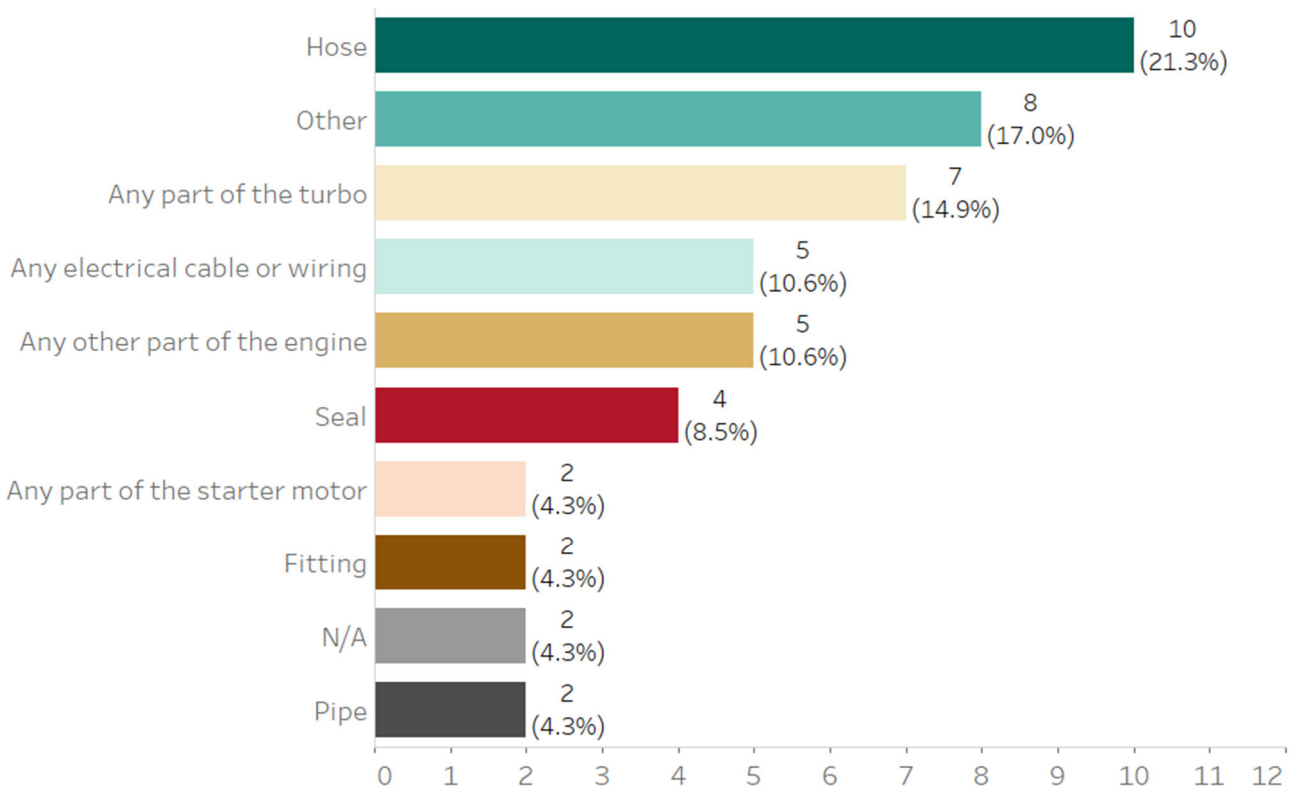
Ancillary reports - failed component

Although the hose remains the most common single failed component since FY 2020 Q2, there was a 33% decrease this period from last quarter.

This quarter saw an increase in any part of the turbo being listed as a failed component, with seven incidents this quarter compared to two in Q3.

The Regulator recently conducted a review of incidents in which the failed component was listed as 'other' to reduce future FOMP incident notifications with this category.

Figure 12: Ancillary reports - failed components, between 1 April 2022 and 30 June 2022



Fires on mobile plant April – June 2022

Table 4: Ancillary reports – failed component, between 1 April 2021 and 30 June 2022

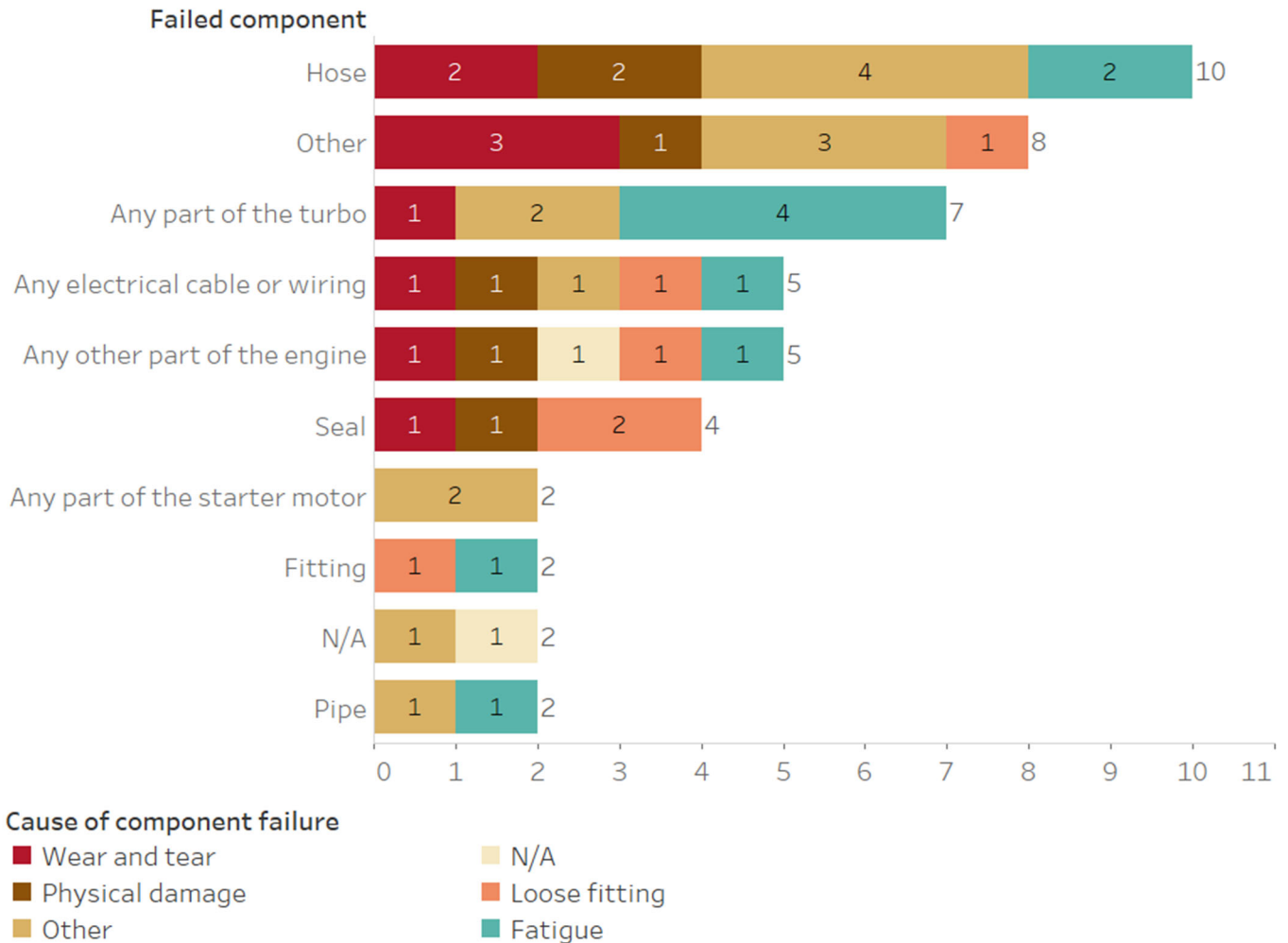
FAILED COMPONENT	FY 2021 Q4	FY 2022 Q1	FY 2022 Q2	FY 2022 Q3	FY 2022 Q4	GRAND TOTAL
Hose	9	12	12	15	10	58
Other	9	15	9	9	8	50
Any electrical cable or wiring	7	5	8	4	5	29
Any part of the turbo	6	6	5	2	7	27
Fitting	3	5	8	1	2	19
Any other part of the engine	4	5	1	1	5	16
Seal	3	5	3	1	4	16
N/A	1	2	1	3	2	9
Any part of the braking system	2	--	4	2	-	8
Pipe	1	1	2	2	2	8
Any part of the starter motor	2	1	2	-	2	7
Cooling system failure	--	2	1	1	-	4
Transmission or drive chain	--	--	2	1	-	3

Ancillary reports - combination failed component and cause of component failure

The most common combinations this quarter were ‘hose’ and ‘other’ and ‘any part of the turbo’ and ‘fatigue’, both combinations accounting for four notified incidents out of 47 (9%).

Categories may be recorded as ‘other’ for several reasons including human errors or uncategorised component failures. The Regulator recently conducted a review of incidents in which failed components and cause of component failure were listed as ‘other’ to reduce the instances of this grouping in future reports.

Figure 13: Ancillary reports - failed component and cause of component failure, between 1 April 2022 and 30 June 2022



Fires on mobile plant April – June 2022

Table 5: Ancillary reports - failed component and cause of component failure, between 1 January 2021 and 31 March 2022²

FAILED COMPONENT + CAUSE	FY 2021 Q4	FY 2022 Q1	FY 2022 Q2	FY 2022 Q3	FY 2022 Q4	GRAND TOTAL
Other + other	8	11	6	5	3	33
Hose + wear and tear	4	1	2	8	2	21
Hose + other	-	5	3	1	4	13
Hose + physical damage	3	3	3	2	2	13
Any electrical cable or wiring + other	4	2	3	1	1	11
Any part of the turbo + fatigue	1	1	2	2	4	10
Fitting + loose fitting	1	4	3	-	1	9

² 9 or more incidents since 1 January 2021

Incident details

The information in the table provides a brief summary of the fire on mobile plant incidents reported this quarter.

Mine type / Operation type	Equipment model	Failed component	Heat source	Fuel source	Extinguished by
Coal / Open cut	Low Loader Trailer	N/A	Friction e.g. brakes	Grease	Hand-held fire extinguisher
Coal / Open cut	830E	Any electrical cable or wiring	Electrical component	Electrical wiring	Water tanker
Construction materials / Open cut	990H	Seal	Turbo	Engine oil	Other
Coal / Open cut	793D	Other	Battery	Electrical wiring	Hand-held fire extinguisher
Coal / Open cut	SK50	Pipe	Engine	Diesel or petrol	Fire protection system (manually deployed)
Construction materials / Open cut	K018/MR1102 EV02	Other	Friction e.g., brakes	Other	Hand-held fire extinguisher
Coal / Open cut	D11	Hose	Exhaust system	Hydraulic oil	Hand-held fire extinguisher
Coal / Open cut	789C	Any part of the turbo	Exhaust system	Engine oil	Fire protection system (manually deployed)
Metals / Underground	MX-0400-1	Other	Electrical component	Other	Hand-held fire extinguisher
Coal / Open cut	O&K RH340	Seal	Turbo	Hydraulic oil	Fire protection system (manually deployed)
Coal / Open cut	773E	Seal	Exhaust system	Diesel or petrol	Fire protection system (manually deployed)
Coal / Open cut	854G	Any part of the starter motor	Electrical component	Hydraulic oil	Fire protection system (manually deployed)
Coal / Open cut	3900	Fitting	Exhaust system	Engine oil	Fire protection system (automatically deployed)
Coal / Open cut	MT4400	N/A	Electrical component	Other	Water tanker
Coal / Open cut	9350	Any part of the turbo	Exhaust system	Engine oil	Self-extinguished
Coal / Open cut	854G	Any part of the turbo	Turbo	Engine oil	Fire protection system (manually deployed)
Coal / Open cut	EH4500-2	Other	Battery	Other	Hand-held fire extinguisher
Coal / Open cut	PC5500	Any part of the turbo	Turbo	Engine oil	Fire protection system (manually deployed)
Mineral sands / Dredging	14H	Any part of the starter motor	Electrical component	Diesel or petrol	Water tanker
Coal / Open cut	SKF-12	Any electrical cable or wiring	Exhaust system	Diesel or petrol	Hand-held fire extinguisher

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Coal / Open cut	D10T2	Seal	Turbo	Hydraulic oil	Fire protection system (automatically deployed)
Coal / Open cut	6040	Fitting	Exhaust system	Hydraulic oil	Fire protection system (automatically deployed)
Coal / Open cut	793D	Any other part of the engine	Electrical component	Engine oil	Fire protection system (automatically deployed)
Metals / Underground	MT5020	Any other part of the engine	Turbo	Engine oil	Fire protection system (automatically deployed)
Metals / Underground	AD60B	Hose	Engine	Diesel or petrol	Fire protection system (manually deployed)
Coal / Open cut	996B	Hose	Engine	Hydraulic oil	Fire protection system (manually deployed)
Metals / Underground	TH663	Any other part of the engine	Friction e.g., brakes	Grease	Self-extinguished
Coal / Open cut	793D	Any other part of the engine	Exhaust system	Other	Fire protection system (automatically deployed)
Coal / Open cut	793D	Hose	Exhaust system	Other	Fire protection system (manually deployed)
Coal / Open cut	789D	Any part of the turbo	Exhaust system	Engine oil	Hand-held fire extinguisher
Coal / Open cut	6060	Any electrical cable or wiring	Electrical component	Electrical wiring	Hand-held fire extinguisher
Metals / Underground	P40.17EE	Any electrical cable or wiring	Electrical component	Electrical wiring	Hand-held fire extinguisher
Construction materials / Open cut	385B	Hose	Engine	Hydraulic oil	Hand-held fire extinguisher
Coal / Processing	D10T	Any other part of the engine	Exhaust system	Other	Hand-held fire extinguisher
Coal / Open cut	D11T	Hose	Exhaust system	Hydraulic oil	Hand-held fire extinguisher
Coal / Open cut	Hilux	Other	Friction e.g., brakes	Grease	Hand-held fire extinguisher
Coal / Open cut	D11T	Hose	Turbo	Hydraulic oil	Fire protection system (manually deployed)
Coal / Open cut	D10T	Other	Exhaust system	Engine oil	Hand-held fire extinguisher
Coal / Open cut	24M	Pipe	Engine	Engine oil	Fire protection system (automatically deployed)
Coal / Underground	SAMSON 70.10	Hose	Turbo	Engine oil	Hand-held fire extinguisher
Coal / Open cut	793D	Any part of the turbo	Engine	Engine oil	Self-extinguished
Coal / Open cut	996B	Other	Electrical component	Grease	Hand-held fire extinguisher
Metals / Open cut	789C	Any part of the turbo	Turbo	Engine oil	Fire protection system (manually deployed)
Coal / Open cut	D11T	Hose	Turbo	Hydraulic oil	Hand-held fire extinguisher

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Coal / Open cut	160T	Other	Friction e.g., brakes	Grease	Water tanker
Metals / Underground	730	Hose	Exhaust system	Hydraulic oil	Hand-held fire extinguisher
Coal / Open cut	930E	Any electrical cable or wiring	Electrical component	Other	Self-extinguished
Coal / Open cut	Low Loader Trailer	N/A	Friction e.g., brakes	Grease	Hand-held fire extinguisher
Coal / Open cut	830E	Any electrical cable or wiring	Electrical component	Electrical wiring	Water tanker
Construction materials / Open cut	990H	Seal	Turbo	Engine oil	Other
Coal / Open cut	793D	Other	Battery	Electrical wiring	Hand-held fire extinguisher
Coal / Open cut	SK50	Pipe	Engine	Diesel or petrol	Fire protection system (manually deployed)
Construction materials / Open cut	K018/MR1102 EV02	Other	Friction e.g., brakes	Other	Hand-held fire extinguisher
Coal / Open cut	D11	Hose	Exhaust system	Hydraulic oil	Hand-held fire extinguisher
Coal / Open cut	789C	Any part of the turbo	Exhaust system	Engine oil	Fire protection system (manually deployed)

For further information refer to our dedicated [Fires on mobile plant](#) web page.